DE PLANTIS TOXICARIIS E MUNDO NOVO TROPICALE COMMENTATIONES X

NEW DATA ON THE MALPIGHIACEOUS NARCOTICS OF SOUTH AMERICA

BY

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Recent investigations have indicated how much remains to be done to clarify our understanding of the preparation of the South American hallucinogen made basically from the bark of *Banisteriopsis Caapi* (Spr. ex Griseb.) Morton or *B. inebrians* Morton (8, 20, 24).

Although it has been shown that the additive *caapi-pinima* (''painted caapi'') of the Tukano Indians of the Rio Uaupes of Brazil was not the apocynaceous *Prestonia* (*Haemadictyon*) *amazonica* (Bth.) Macbride (26), as suggested a century ago by Spruce (27), and accepted widely, even in the chemical literature (11), several members of this family have been reported as admixtures: the crushed leaves of *Malouetia Tamaquarina* A. DeCandolle amongst the Makunas of the Colombian Vaupés (21) and a species of *Tabernaemontana* in Peru (8).

Sundry solanaceous plants are so used. In the Rio Negro-Vaupés region, tobacco (*Nicotiana Tabacum* L.) is often added (2, 14, 21). The Sionas of the Colombian Putumayo employ a Datura, probably *D. suaveolens* Humboldt & Bonpland ex Willdenow (2, 14, 21). A species of Brunfelsia—possibly also taken alone as an hal-

lucinogen—is occasionally added to ayahuasca amongst the Jivaro and other Indians of the westernmost Amazon of Ecuador and Colombia (14, 22).

Some of the additives reported are not known to have biodynamic constituents, and their use may, consequently, be attributed to symbolic reasons. Two amaranthaceous plants of the Colombian Putumayo fall into this category: *Alternanthera Lehmanii* Hieron. (2, 9, 21) and a species of Iresine (21).

Very recent research—perhaps the most extensive on the components of ayahuasca in one geographical area—have discovered a number of curious admixtures amongst the Kulina and Sharanahua of Amazonian Peru (19). In addition to Psychotria (discussed below), the list includes several ferns: *Lygodium venustum* Sw. and *Lomariopsis japurensis* (Mart.) J.Sm.; as well as the loranthaceous *Phyrgilanthus eugenioides* Eichler, the labiate *Ocimum micranthum* Willdenow, Epiphyllum sp. and Opuntia sp. of the Cactaceae, the cyperaceous Cyperus sp., a member of the guttiferous genus Clusia and two other plants of which the voucher specimens could not be determined.

Perhaps the most significant discoveries relate to the use as additives of leaves of *Banisteriopsis Rusbyana* (Ndz.) Morton, the *oco-yajé* of the westernmost Amazon (2, 6, 14) and leaves of several species of Psychotria, especially of *P. viridis* and *P. carthaginensis* Jacquin in sundry widely separated areas of the Amazon (13, 14, 16, 19, 20, 22). The use of the leaves of these plants is significant mainly from the chemical point of view. The drink called variously *ayahuasca, caapi, natema, pinde* or *yajé*, prepared from the bark of *Banisteriopsis Caapi* or *B. inebrians*, contains the β-carboline alkaloids harmine, harmaline and tetrahydroharmine (20). The leaves of *Banisteriopsis Rusbyana* contain N-N,dimethyltrypta-

mine, the first malpighiaceous species from which a tryptamine has been isolated (1, 6, 15). Similarly, the leaves of *Psychotria viridis* and *P. carthaginensis* (7, 20) have been found to contain the same tryptamine—again the first known occurrence of tryptamines in the family Rubiaceae. Obviously, the addition of leaves of these plants—as the addition of solanaceous plants with tropane alkaloids—greatly heightens the narcotic effects of the drink. That the utilization of *Psychotria* leaves is widespread has been shown by the recent discovery of this custom in the westernmost Amazon in Ecuador and Colombia, in several isolated localities in Amazonian Peru and in the southwestern Amazon of Brazil (7, 13, 14, 16, 17, 20, 22).

In pursuit of our studies of additives or possible additives to ayahuasca, the following voucher specimens authenticating new data are offered.

Teliostachya lanceolata *Nees* var. **crispa** *Nees ex Martius* Fl. Bras. 9 (1847) 72.

PERU: Departamento de Loreto, Iquitos and vicinity. "Cultivated. Flowers white with violet. *Toé negra.*" July 15, 1967. *R. Martin, T. Plowman et* C. *Lau-Cam 1638* [Det. Plowman].

This variety of the acanthaceous *Teliostachya lanceolata* is added to ayahuasca and may be used alone also as a narcotic. The collectors received the following data from a Kokama Indian informant: "1) Used as an admixture to ayahuasca (*Banisteriopsis Caapi*). Two branches are cooked with ayahuasca for about 11 hours. 2) When taken alone, about 10 leaves are cooked gently for 7 hours. The effects (on the mind) last for three days, during which one converses with the spirit of the plant. Also causes loss of sight for three days."

Chemical studies have apparently not been carried out on Teliostachya (10). In view, however, of the suspected

presence in the acanthaceous genus Justicia, source of an admixture to Virola-snuff (25) and reported to be itself the source of an hallucinogenic snuff (4), phytochemical examination of these ethnobotanical field notes might seem to be fully warranted.

It is interesting that this plant is called *toé negra*, since *toé* or *toá* is the Peruvian name of the hallucinogenic *Datura suaveolens*.

Psychotria carthaginensis *Jacquin* Enum. Pl. Carib (1762) 16.

PERU: Departamento de Loreto, Río Nanay, Samito. Alt. ca. 100 m. Forest. "Shrub 2 m. tall. Infl. axis light green. Fr. dark green. Use: the leaf is used in combination with ayahuasca. N. v. *sameruca*." February 20, 1969. *T. Plowman 2528*.

Juanulloa ochracea *Cuatrecasas* in Brittonia 10 (1958) 148.

COLOMBIA: Comisaría del Caquetá, Río Caquetá. Secondary forest near Floresta, ca. 15 km. downstream from Puerto Limón. "Climbing epiphytic shrub on fallen tree, 3 m. tall. Calyx red, corolla yellow; leaves coriaceous. Trunk and leaves used for wounds. V. n. *ayahuasca* (Inga)." December 20, 1968. *T. Plowman 2176*.

The application to the solanaceous *Juanulloa ochracea* of the name *ayahuasca* may indicate that it represents either a species employed directly as the source of a narcotic or one of the additives to the ayahuasca drink. There is, of course, a chemical basis for this belief. The alkaloid parquine, isolated from a member of the solanaceous genus Cestrum, has been reported from a species of Juanulloa (18).

Calathea Veitchiana *Veitch ex Hooker fil.* Bot. Mag. (1865) t. 5535.

PERU: Departamento de Loreto, Río Nanay. Chiriara. "Herb 1.2 m. tall in forest. Leaf dark green above with lt. green markings along midrib and margin; reddish purple beneath; pulvinus pale

greenish brown. Peduncle reddish; floral bracts pale green above, red beneath. Fls. white (?). Use: mixed with ayahuasca to see visions." February 28, 1959. *T. Plowman (with F. Tina) 2572.*

No biodynamic constituent is known from the Marantha-ceous *Calathea Veitchiana* (10).

Pontederia cordata *Linnaeus* Sp. Pl. (1753) 288.

COLOMBIA: Comisaría del Putumayo, Mocoa. Camino de Herradura Antiguo y Río Rumiyaco. Alt. 700–850 m. "N. v. *amarón borracheró.* Planta aquática. Flores blancas. Se usa para quitar parálisis fasciales." October 10, 1965. *H. García-Barriga, Y. Hashimoto et M. Ishikawa 18685.*

The vernacular name *amarón borrachero* suggests that *Pontederia cordata* either possesses intoxicating principles or is employed as an additive to a narcotic preparation made basically from another plant. The principal narcotic employed in the area of the collection is the drink prepared from *Banisteriopsis inebrians.* In view of the probable lack of toxic principles in this species (10), its use as a symbolic additive is the more likely of the possibilities.

It has long been known that natives in the Amazon area recognize different age forms or ecological forms of plants as "different kinds" of the same species. They even ascribe to these "different kinds" of plants a variety of biological effects. There may well be different chemical composition—at different ages or stages of growth—we do not know. At any rate, the Indians do definitely ascribe different strengths or intensities of effect to their "different kinds" of the same species. This curious treatment according to age forms or stages of growth is especially well recognized in native classifications of the caapi or yagé plant.

Mr. Stephen Hugh-Jones of King's College, Cambridge, spent many months amongst the Barasanas of

the Río Piraparaná of the Colombian Comisaría del Vaupés. An anthropologist, he collected a number of Barasana "varieties" of kahi or yagé. With the exception of one collection, these specimens all appear to be referable to *Banisteriopsis inebrians*. They have been identified by Mr. T. Plowman and checked by the author. The collection is ethnobotanically very significant, even though all of the specimens are in sterile condition.

In a letter dated January 1, 1971, Hugh-Jones wrote: "I had hoped to collect a complete collection of the varieties of Banisteriopsis with enough material for you to do chemical analysis, etc., but didn't. My chief informant, a Barasana shaman, taught me well but very much on his own terms. He was happy to tell me all I wanted to know about yagé, etc., but hated the idea of my collecting specimens and consistently refused to let me. At dusk on my last night in the field he suddenly offered to go with me to get leaf-only samples of yagé —it is this that I send you. . . . The specimens are thin and few, as I was only allowed to take a bit of each.

"There are eight varieties of yagé represented—the Indians in the immediate area recognize about 10 varieties, so the collection is not quite complete. . . . All I have done is to give you the names of the different varieties with their approximate English translations."

Banisteriopsis inebrians *Morton* in Journ. Wash. Acad. Sci. 21 (1931) 485.

COLOMBIA: Comisaría del Vaupés, Río Piraparaná. "Barasana name: *Kahi-ukó* (yageé catalyst)." 1970. *S. Hugh-Jones 3*.—Same locality. "Barasana name: *wai-buku-lihoa-ma* (game animal head yagé)." 1970. *S. Hugh-Jones 4*.—Same locality. "Barasana name: *wenanduri-guda-hubea-ma* (the yagé that came inside the jurupary instrument called *wenanduri*)." *S. Hugh-Jones 5*.—Same locality. Barasana name: *wai-huhua-guda-hubea-ma* (yagé which came inside the jurupary 'fish swim bladder'). Used during 'dance house' ceremony. One sees *people* under the influence." 1970. *S. Hugh-Jones 6*.—Same locality. "Bara-

sana name: *yaiya-s̃uava-kahi-ma* (red jaguar yagé). One sees red under the influence, used during fruit-blowing ceremonies." 1970. *S. Hugh-Jones 7*.—Same locality. "Barasana name: *s̃uari-tukuro-kahima* (red ground yagé). Again one sees red, used during fruit-blowing. 1970. *S. Hugh-Jones 8*.—Same locality. "Barasana name: *h̃e-kahima* (jurupary yagé); *kumua-basere-kahi-ma* (yagé for shamanizing)." 1970. *S. Hugh-Jones 1*.

The following collection, insofar as is possible to determine sterile material on characters proposed by Cuatrecasas, would appear to be referable to:

Banisteriopsis Rusbyana (*Ndz.*) *Morton* in Journ. Wash. Acad Sci. 21 (1931) 487.

Same locality. "Barasana names: *mené-kahi-ma*, *nyoko-buku-gudahubea-ma* (Inga yagé, the vine which came inside the jurupary instrument called 'old star')." 1970. *S. Hugh-Jones 2* [Det. Plowman].

That there remains much to do in connection with the identification of "different kinds" of caapi and with additives is clearly indicated by the following data concerning still unidentified "kinds" of caapi and additives known only through Indian names.

Brüzzi has indicated that caapi amongst the Tukano of the Brazilian course of the Rio Vaupés may be made from the bark of the following vines (3): *mērē-oē-kaxpidá* (inga vine), *boxká-dá* (vine of the forest, of which there are two kinds), *kúri-kaxpi-dá* (a noded vine, giving the strongest caapi drink), *sêi-pixkōrō-dá* (monkey-tail vine), *yehé-ñōxkã-dá* (heron-foot vine). None of these vines has been identified by means of botanical material, but it is probable that all may be growth stages of *Banisteriopsis Caapi*, unless, as has been suggested, the third kind—*kúri-kaxpi-dá*—may because of its noded stem, be referred to *Gnetum nodiflorum* Brogniart or *G. Leyboldii* Tula, very common elements of the riverside

vegetation of the Vaupés area, albeit plants not known to possess biodynamic principles.

These same Tukano Indians of Brazil use as additives the crushed leaves of *kaxpi-pūrī* and *kãna-pūrī* as well as the leaves of *doxkó-mo-rērī-dá* and *duxtú-sarẽnõ-dá* (3). In addition to the foregoing vines, the Tarianos of the Colombian Vaupés employ as admixtures three "kinds" of the plant called *ma-kaxpi-dá* which is said to make the drink "more virulent". None of these plants is as yet determined botanically on the basis of voucher specimens.

According to the anthropologist, Dr. Gerardo Reichel-Dolmatoff (letter to R. E. Schultes dated November 15, 1971), the Tukano of the Colombian course of the Río Vaupés have what may be even other "kinds" of caapi. *Vaí-gahpí* (fish caapi) is a leafy vine with small flowers, said to resemble those of coffee, straight stems without nodules and thin, smooth bark. Another "kind"—*muchípu-gahpí-dá* sun caapi)—is reported to be a "leafy vine with small leaves", with leaves rather violin-shaped or strongly constricted in the middle. Botanical material on which to base identifications is not available.

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